Applicant(s): Ghose, et al.	
Application No.: 10/695,889	Group Art Unit: 2114
Filed: 10/23/2003	Examiner: Gabriel L. Chu
Title: Failure Analysis Method and System for Storage Area Networks	
Attorney Docket No.: 00121-0000700000	

Amendments to the claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of the claims:

1. (Currently Amended) A method for configuring a storage virtualization controller to manage errors in a storage area network, comprising:

initializing a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy;

identifying one or more predetermined error actions and one or more error events associated with the storage area network;

specifying an error pattern based upon a combination of one or more error events in the storage area network; and

associating an error action to perform in response to receiving the combination of one or more error events of the error pattern.

2. (Original) The method of claim 1 further comprising loading the error pattern and associated error action into a failure analysis module.

3. (Previously presented) The method of claim 1 further comprising initializing [a] the failure analysis module with the one or more predetermined error actions, one or more

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predetermined system error events and one or more predetermined input-output error events associated with the storage area network.

4. (Original) The method of claim 1 wherein the configuration and management is performed using a centralized failure analysis module.

5. (Canceled)

6. (Previously presented) The method of claim 1 wherein each of the one or more predetermined error actions describes a set of operations to accommodate the occurrence of the one or more system error events and one or more input-output error events.

7. (Original) The method of claim 1 wherein the one or more error events are selected from a set of error events including predetermined system error events and predetermined input-output error events.

8. (Original) The method of claim 7 wherein each of the one or more system error events occurs when an error event occurs corresponding to a module within the storage virtualization controller.

9. (Previously presented) The method of claim 1 wherein each of one or more input-output error events corresponds to a communication error between the storage virtualization controller and servers or storage elements in the storage area network.

10. (Original) The method of claim 1 wherein the error pattern and associated error actions are specified incrementally over time without recoding.

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11. (Original) The method of claim 1 wherein the error pattern is generated automatically through a logging and analysis of past error events.

12. (Currently amended) A method of managing the occurrence of errors generated in a storage area network, comprising:

initializing a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy;

generating one or more error events responsive to the occurrence of one or more conditions of components being monitored in the storage area network;

receiving the one or more error events over a time interval for analysis in [[a]] the primary failure analysis module;

comparing a temporal arrangement of the error events received against a set of error patterns loaded in the primary failure analysis module; and

identifying the error pattern from the set of error patterns and error action corresponding to the error pattern to perform in response to the comparison in the primary failure analysis module.

13. (Original) The method of claim 12 wherein the one or more error events are converted into error event codes by a set of monitor modules monitoring the components in the storage area network.

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14. (Original) The method of claim 12 wherein the one or more error events are selected from a set of error events including predetermined system error events and predetermined input-output error events.

15. (Original) The method of claim 14 wherein each of the one or more system error events occurs when an error event 'occurs corresponding to a module within a storage virtualization controller.

16. (Original) The method of claim 14 wherein each of the one or more predetermined input-output error events corresponds to a communication error between the storage virtualization controller and servers or storage elements in the storage area network.

17. (Canceled)

18. (Currently amended) An apparatus that configures a storage virtualization controller to manage errors in a storage area network, comprising:

a processor capable of executing instructions;

a memory containing instructions capable of execution on the processor that cause the processor to initialize a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy, identify one or more predetermined error actions and one or more error events associated with the storage area network, specify an error pattern based upon a combination of one or more error events in the storage area network and

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associate an error action to perform in response to receiving the combination of one or more error events of the error pattern.

19. (Currently amended) The apparatus of claim 18 further comprising instructions in the memory when executed load the error pattern and associated error action into [a] the failure analysis module in the memory.

20. (Currently amended) The apparatus of claim 18 further comprising instructions in the memory when executed initialize [a] the failure analysis module with the one or more predetermined error actions, one or more predetermined system error events and one or more predetermined input-output error events associated with the storage area network.

21. (Original) The apparatus of claim 18 wherein the configuration and management is performed using a centralized failure analysis module.

22. (Canceled)

23. (Previously presented) The apparatus of claim 18 wherein each of the one or more predetermined error actions describes a set of operations to accommodate the occurrence of the one or more system error events and one or more input-output error events.

24. (Original) The apparatus of claim 18 wherein the one or more error events are selected from a set of error events including predetermined system error events and predetermined input-output error events.

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25. (Original) The apparatus of claim 24 wherein each of the one or more system error events occurs when an error event occurs corresponding to a module within the storage virtualization controller.

26. (Previously presented) The apparatus of claim 18 wherein each of one or more input-output error events corresponds to a communication error between the storage virtualization controller and servers or storage elements in the storage area network.

27. (Currently Amended) An apparatus for managing the occurrence of errors generated in a storage area network, comprising:

a processor capable of executing instructions;

a memory containing instructions when executed on the processor initialize a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy, generate one or more error events responsive to the occurrence of one or more conditions of components being monitored in the storage area network, receive the one or more error events over a time interval for analysis in [[a]] the primary failure analysis module, compare a temporal arrangement of the error events received against a set of error patterns loaded in the primary failure analysis module and identify the error pattern from the set of error patterns and error action corresponding to the error pattern to perform in response to the comparison in the primary failure analysis module.

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28. (Original) The apparatus of claim 27 wherein the one or more error events are converted into error event codes by a set of monitor modules monitoring the components in the storage area network.

29. (Previously presented) The apparatus of claim 27 wherein the one or more error events are selected from a set of error events including predetermined system error events and predetermined input-output error events.

30. (Currently Amended) The apparatus of claim [27] 29 wherein each of the one or more system error events occurs when an error event occurs corresponding to a module within the storage virtualization controller.

31. (Currently Amended) The apparatus of claim [27] 29 wherein each of the one or more input-output error events corresponds to a communication error between the storage virtualization controller and servers or storage elements in the storage area network.

32. (Previously presented) The apparatus of claim 27 wherein the failure analysis module receiving the one or more error events is configured as a primary failure analysis module for processing error events and alternate failure analysis modules are configured as backups to the primary failure analysis module to facilitate high-availability and redundancy.

33. (Currently Amended) An apparatus for configuring a storage virtualization controller to manage errors in a storage area network, comprising:

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means for initializing a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy;

means for identifying one or more predetermined error actions and one or more error events associated with the storage area network;

means for specifying an error pattern based upon a combination of one or more error events in the storage area network; and

means for associating an error action to perform in response to receiving the combination of one or more error events of the error pattern.

34. (Currently Amended) An apparatus for managing the occurrence of errors generated in a storage area network, comprising:

means for initializing a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy;

means for generating one or more error events responsive to the occurrence of one or more conditions of components being monitored in the storage area network;

means for receiving the one or more error events over a time interval for analysis in [[a]] the primary failure analysis module;

means for comparing a temporal arrangement of the error events received against a set of error patterns loaded in the primary failure analysis module; and

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means for identifying the error pattern from the set of error patterns and error action corresponding to the error pattern to perform in response to the comparison in the primary failure analysis module.

35. (Currently Amended) A method for configuring a storage virtualization controller to manage errors in storage area network, comprising:

initializing a primary failure analysis module for processing error events and error actions and an alternate failure analysis module configured as a backup to the primary failure analysis module to facilitate high-availability and redundancy;

identifying one or more predetermined error actions and one or more error events associated with the storage area network;

specifying an error pattern based upon a combination of one or more error events in the storage area network, presented through a graphical user interface with corresponding threshold values; and

associating an error action presented through the graphical user interface to perform in response to receiving the combination of one or more error events of the error pattern that satisfy the threshold value requirements.

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